NON-PUBLIC?: N
ACCESSION #: 9109200228
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Joseph M. Farley Nuclear Plant PAGE: 1 OF 3

DOCKET NUMBER: 05000348

TITLE: Reactor Trip Caused By Lightning Induced Deenergization Of 1B Startup Transformer
EVENT DATE: 08/19/91 LER #: 91-009-00 REPORT DATE: 09/17/91

OTHER FACILITIES INVOLVED: J.M. Farley - Unit 2 DOCKET NO: 05000364

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: D. N. Morey, General Manager - TELEPHONE: (205) 899-5156
Nuclear Plant

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

At 1720 on 08-19-91, while operating at approximately 100 percent power, a reactor trip occurred. A lightning induced deenergization of the 1B startup transformer (SUT) caused the loss of 1B and 1C reactor coolant pumps (RCPs). The reactor tripped due to RCP breakers opening while at 100 percent power.

A lightning strike in the 230KV switchyard caused an instantaneous overcurrent trip on phase 2 of the 1B SUT. The deenergization of the 1B SUT caused a loss of power at 4160V buses B and C which deenergized 1B and 1C RCP. The plant responded to the loss of B train offsite power as designed with the automatic start and tie-on of the 1B and 2C Diesel Generators (DG) to the B train Engineered Safety Feature (ESF) 4160V buses G and J. This restored power to the B train ESF equipment. A train offsite power was not lost during this event.

Inspection and testing of 1B SUT, the oil static cables and the associated switchyard breakers revealed a damaged phase 2 lightning arrestor located at the 1B SUT 230KV terminal. The damaged lightning arrestor was replaced, and the 1B SUT returned to service.

An engineering study to investigate possible methods of preventing lightning induced reactor trips has been initiated.

The unit returned to power operation at 0921 on 08-21-91.

END OF ABSTRACT

Plant and System Identification

Westinghouse - Pressurized Water Reactor
Energy Industry Identification System codes are identified in the text as XX!.

Summary of Event

At 1720 on 08-19-91, while operating at approximately 100 percent power, a reactor trip occurred, A lightning induced deenergization of the 1B startup transformer EA! caused the loss of 1B and 1C reactor coolant pumps. The reactor tripped due to the opening of RCP breakers while at 100 percent power.

Description of Event

On 08-19-91, the unit was operating at approximately 100 percent power and a lightning storm was in progress. At 1720 a reactor trip was initiated due to the loss of 1B and 1C RCPs while at 100 percent power. A lightning strike in the 230KV switchyard caused an instantaneous overcurrent trip on phase 2 of the 1B SUT. The deenergization of the 1B SUT caused a loss of power to 4160V buses B and C which in turn deenergized 1B and 1C RCPs. The plant automatically responded to the loss of B train offsite power with the start and subsequent tie-on of the 1B and 2C Diesel Generators to the B train ESF 4160V buses G and J. This restored power to B train ESF equipment. A train offsite power was not lost during this event.

Following the trip, the operators implemented FNP-1-EEP-0, (Reactor Trip or Safety Injection) and FNP-1-ESP-0.1 (Reactor Trip Response) ensuring that the unit was safely in Mode 3.

With the deenergization of 4160V bus C, power was lost to the Emergency Operations Facility (EOF).

At the time of the trip, 1-2A DG was inoperable for maintenance. Thus, the A train ESF buses had their emergency power supply (1-2A DG) inoperable and the B train ESF buses had their normal power supply (1B SUT) inoperable. The unit conservatively commenced a cooldown to hot shutdown. Mode 4 was entered at 0036 on 08-20-91.

Unit 2 was also affected by the event in that the power supplies for both shared trains of Control Room Emergency Ventilation were aligned to Unit 1. Unit 2 completed the transfer of the electrical alignment of B train Control Room Emergency Ventilation from Unit 1 to Unit 2 at 1940 on 08-19-91.

1B SUT was returned to service at 1037 on 08-20-91.

The unit returned to power operation at 0921 on 08-21-91.

Cause of Event

This event was caused by a lightning induced instantaneous overcurrent trip on phase 2 of the 1B SUT. This loss of 1B SUT caused the deenergization of 4160V buses B and C, which in turn caused the loss of 1B and 1C RCPs. The reactor tripped due to the opening of the RCP breakers at 100 percent power.

Reportability Analysis and Safety Assessment

This event is reportable because of the actuation of the Reactor Protection System and the actuation of an Engineered Safety Feature (Emergency Diesel Generators 1B and 2C). After the trip, the following safety systems operated as designed:

- diesel generators started and tied-on to the 4160V buses G and J, respectively,
- main feedwater was isolated by automatic closure of the flow control and bypass valves,
- auxiliary feedwater pumps started automatically and provided flow to the steam generators, and
- source range nuclear detectors energized automatically.

Reactor coolant system pressure was controlled by the manual use of

pressurizer pressure control components.

There was no effect on the health and safety of the public.

Corrective Action

Inspection and testing of 1B SUT, the oil static cables and the associated switchyard breakers revealed a damaged phase 2 lightning arrestor located at the 1B SUT 230KV terminal. Although damaged as a result of the lightning, the arrestor protected the transformer and associated oil static cable. The damaged lightning arrestor was replaced. Following satisfactory testing the 1B SUT was returned to service.

An engineering study to investigate possible methods of preventing lightning induced reactor trips has been initiated.

Additional Information

The unit was returned to power operation at 0921 on 08-21-91.

This event would not have been more severe if it had occurred under different operating conditions.

The NRC Emergency Notification System was inoperable during this event from 1915 until 2004. The FNP EOF was without power from 1720 on 08-19-91 until approximately 1030 on 08-20-91.

Other reactor trips caused by lightning previously reported include LER 84-004-00, 85-010-00 and 91-005-00.

ATTACHMENT 1 TO 9109200228 PAGE 1 OF 1

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J. D. Woodard Alabama Power
Vice President-Nuclear
Farley Project the southern electric system

September 17, 1991

10 CFR 50.73

Docket No. 50-348

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Joseph M. Farley Nuclear Plant - Unit 1
Licensee Event Report No. LER 91-009-00

Gentlemen:

Joseph M. Farley Nuclear Plant, Unit 1, Licensee Event Report No. LER 91-009-00 is being submitted in accordance with 10 CFR 50.73. If you have any questions, please advise.

Respectfully submitted,

J. D. Woodard

JDW/BHW:map 0937

Enclosure

cc: Mr. S. D. Ebneter
Mr. G. F. Maxwell

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